

English

# Thermo Scientific Orion Star™ RDO® Optical Dissolved Oxygen Meter

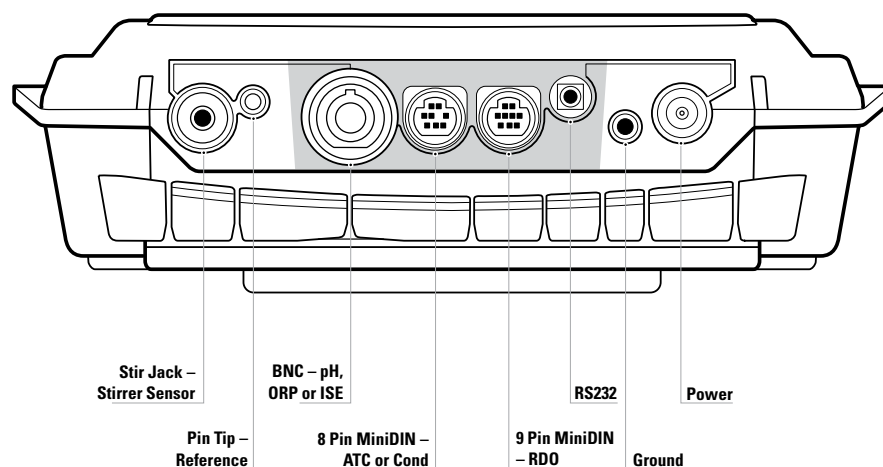
## RDO

## Quick Start Guide

### Key Description

	<b>power</b>		<b>up arrow</b>		<b>line select</b>		<b>stir</b> (benchtop meters only)
	<b>calibrate</b>		<b>down arrow</b>		<b>setup</b>		
	<b>measure</b>		<b>digit</b>		<b>view log</b>		

### Meter Connections



All connectors on the 5-Star Plus benchtop meter are depicted above. All connectors on the 5-Star Plus portable meter are highlighted in gray.

The 3-Star Plus and 4-Star Plus meters will have fewer connectors. For example, the 3-Star Plus portable RDO meter will only have 9 pin miniDIN, 8 pin miniDIN (for ATC probe only) and RS232 connectors.

For the complete Orion Star™ and Star Plus meter user guide, visit [www.thermo.com/water](http://www.thermo.com/water).

### Important Note – Read Before Assembling or Operating the Equipment

The RDO optical DO sensor has an internal clock that counts down the 365 day lifespan of a new optical cap. The countdown begins when the RDO cap is installed on the RDO sensor, the RDO sensor is connected to the meter and the first measurement is taken. The 365 day countdown cannot be reset or changed once the first measurement is taken.

#### To View the Remaining Lifespan of the RDO Cap

In the measurement mode, press the **setup** key. Press the **up arrow** key until **dO** is displayed on the top line. Press the **line select** key to move the ► icon to the middle line. Press the **up arrow** key until **LIFE** is displayed on the middle line. The remaining lifespan of the RDO cap, in days, will be displayed on the bottom line. Press the **measure** key to return to the measurement mode.

### Preparation

1. Power adapter (benchtop meters only) – Select the appropriate wall outlet plug and slide the plug plate into the groove on the back of the adapter. **See A.**

Batteries – Select four AA alkaline batteries. Confirm that the meter is off and remove the battery cover. Orient and insert the batteries as depicted in the battery compartment housing. Replace the cover. **See B and C.**

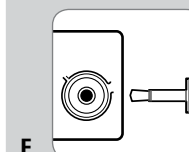
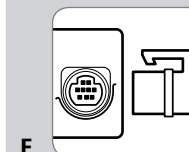
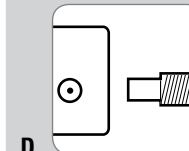
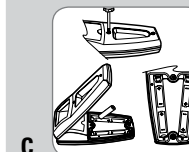
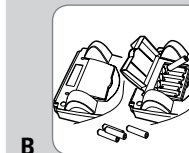
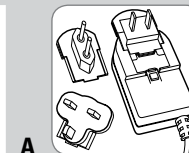
2. Prepare the RDO optical DO sensor according to the directions in the RDO sensor user guide. Install the RDO cap on the RDO sensor before connecting the RDO sensor to the meter.

**Note:** An Err 880 message on the meter indicates that the RDO sensor is not fully connected to the meter. Reconnect the sensor by firmly pushing the sensor connector into the 9 pin miniDIN meter input.

**Note:** An Err 882 message on the meter indicates that the RDO cap is missing or not properly installed on the RDO sensor.

3. Calibration sleeve – To prepare the calibration sleeve, remove the cap from the sleeve and remove the sponge from the cap. Saturate the sponge with distilled water and squeeze all of the excess water out of the sponge. Reassemble the calibration sleeve and insert the RDO sensor.
4. Meter connections – Connect the power adapter to the meter and to the wall outlet (benchtop meters only). **See D.** Connect the RDO sensor to the 9 pin miniDIN input on the meter. **See E.** Connect the stirrer sensor to the stir jack input on the meter (benchtop meters only). **See F.**

**Note:** All unused inputs on the meter should be covered with the black caps.



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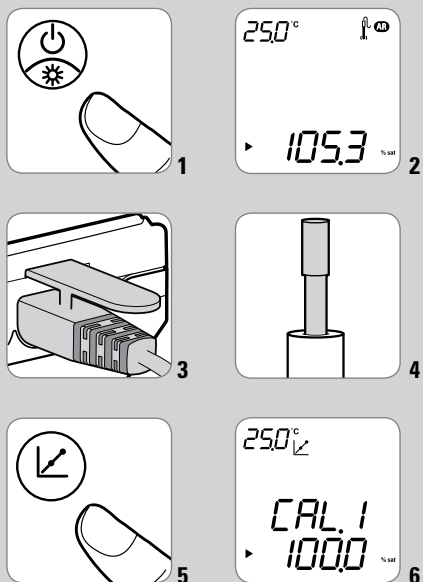
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## Meter Overview

- To power on the meter, press the **power** key.
- Press the **line select** key to choose the top, middle or bottom display line. The ► icon will point to the selected line.
- In the measurement mode, press the **up arrow** or **down arrow** key to change the measurement units on the bottom display line to dissolved oxygen (% saturation), dissolved oxygen (mg/L), barometric pressure (no icon), temperature (no icon) or a blank line.
- To escape out of any meter function, press and hold the **measure** key until the meter returns to the measurement mode.
- The 3-Star, 4-Star and 5-Star RDO optical dissolved oxygen meters can perform an air calibration using water saturated air, water calibration using air saturated water, manual calibration (Winkler titration) or zero point calibration.

## Air Calibration

- Press the **power** key to turn on the meter. **See 1.**
- In the measurement mode, press the **line select** key until the ► icon points to the bottom line and press the **up arrow** key until the **%sat** or **mg/L** icon is shown. **See 2.**
- Make sure that the RDO sensor is connected to the meter. **See 3.**
- Prepare the calibration sleeve, insert the RDO sensor into the prepared calibration sleeve and wait five minutes for the RDO sensor to equilibrate. **See 4.**  
To prepare the calibration sleeve, remove the cap from the sleeve and remove the sponge from the cap. Saturate the sponge with distilled water, squeeze all the excess water out of the sponge and reassemble the calibration sleeve.
- Press the **calibrate** key. **See 5.**
- When the reading stabilizes, the meter will display 100.0% saturation and proceed to the measurement mode. **See 6.**



## RDO Calibration Type Selection

- In the measurement mode, press the **setup** key.
- Press the **up arrow** key until **dO** is displayed on the top line.
- Press the **line select** key to move the ► icon to the middle line. Press the **up arrow** key until **CALt** is displayed on the middle line.
- Press the **line select** key to move the ► icon to the bottom line. Press the **up arrow** key to select the calibration type as **Alr** for a water saturated air calibration, **H2O** for an air saturated water calibration, **mAn** for a manual calibration (Winkler titration) or **SEt0** for a zero point calibration. Alr is the default setting.
- Press the **line select** key to move the ► icon to the top line and press the **measure** key.

## Measurement Mode Selection

- In the measurement mode, press the **setup** key.
- Press the **up arrow** key until **rEAd** is displayed on the top line.
- Press the **line select** key to move the ► icon to the middle line. Press the **up arrow** key until **tYPE** is displayed on the middle line.
- Press the **line select** key to move the ► icon to the bottom line. Press the **up arrow** key to select **AUt0** for the AUTO-READ™ mode, **tlmE** for the timed mode or **COnt** for the continuous mode. AUt0 is the default setting.
- Press the **line select** key to move the ► icon to the top line and press the **measure** key.

## Automatic Datalog Feature

- In the measurement mode, press the **setup** key.
- Press the **up arrow** key until **LOg** is displayed on the top line.
- Press the **line select** key to move the ► icon to the middle line. Press the **up arrow** key until **AUt0** is displayed on the middle line.
- Press the **line select** key to move the ► icon to the bottom line. Press the **up arrow** key to select **OFF** or **On**. OFF is the default setting.
- Press the **line select** key to move the ► icon to the top line and press the **measure** key.

## RDO Optical DO Measurements

Turn on the automatic datalog feature to send measurements to the meter datalog or connect the meter to a printer or computer.

- Rinse the RDO sensor with distilled water, blot it dry with a lint-free tissue and insert the sensor into the sample.
- If the meter is in the AUTO-READ measurement mode, press the **measure** key to start a reading. Once the reading is stable, the **AR** icon will stop flashing and the display will freeze. Press the **measure** key to take a new reading.

If the meter is in the timed measurement mode, the meter will take a dissolved oxygen reading at the frequency specified by the operator. If parameters other than dissolved oxygen are measured, the meter will immediately take the other readings and continuously update the display.

If the meter is in the continuous measurement mode, the meter will immediately start taking readings and continuously update the display. Once the reading is stable, the **%sat** or **mg/L** icon will stop flashing. This mode is not recommended for everyday use, as it consumes a significant amount of the meter's battery power.

- Remove the RDO sensor from the sample, rinse it with distilled water, blot it dry with a lint-free tissue, insert the sensor into the next sample and repeat step 2 or see the RDO sensor user guide for recommended storage.

## Printing Data

If the automatic datalog feature is on, the meter will log a measurement every time the **measure** key is pressed (AUTO-READ and continuous modes) or at the preset time interval (timed mode).

- Connect the meter to a printer or computer and verify the baud rate and output settings in the meter setup menu.
- In the measurement mode, press the **log view** key.
- Press the **up arrow** key to select **SEnd** to print the datalog or **CALs** to print the calibration log.
- Press the **log view** key to send the selected data to the printer or computer.